

PROJECT NUMBER: 2107
PROJECT TITLE: Filter Research & Development
PROJECT LEADER: C. J. Campbell
PERIOD COVERED: June, 1989

I. IMPROVED FILTRATION - INCREASED EFFICIENCY:

- A. **Objective:** Develop filter systems with a higher efficiency than presently available and evaluate them for subjective advantages.
- B. **Status:** To understand the effect of CA Web variability on subjective response, cigarettes made with a CA Web/CA dual filter were selected according to RTD range and subjectively evaluated. The three RTD ranges of 125-144, 145-160, and 161-180mm of water had FTC tar deliveries of 6.7, 6.1, and 5.7mg respectively. The three models were found to be significantly different subjectively from one another.

Project 605 concentric filter models with 50% filter ventilation were made and achieved acceptable FTC tar deliveries. Samples will be submitted for internal panel testing if Flavor Panel screening is favorable.

Filters were made in the Semiworks with a 1.6/35000 tow item to develop the capability curve. Filters made at the Lark Super Lights RTD target with this tow had a marginal firmness (89%) but performed well during combining.

II. IMPROVED FILTRATION - MENTHOL STABILITY:

- A. **Objective:** Investigate methods of improving the stability of menthol delivery in smoke of aged cigarettes.
- B. **Status:** Ageing and internal panel evaluation of eleven cigarette models, some with heat treated filters, is complete. Data is now being evaluated and a report is being prepared.

III. IMPROVED FILTRATION - NOVEL FILTER SYSTEMS:

- A. **Objective:** Develop and evaluate new and unique cigarette filters which may offer a distinct product advantage.
- B. **Status:** CONCENTRIC FILTERS: Models of a 3mg Japanese prototype with a 21mm dual charcoal/concentric filter were found to be too high in delivery. Models with a 27mm dual filter will be made and tested.

CA PLUGWRAP: The results of our evaluation of Dexter's CA plugwrap were reviewed with the supplier. The tow-to-plugwrap bonding was unacceptable with the sample we tested. Dexter indicated that they could utilize a different binder system in the

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sheet which may improve bonding to tow. Any further testing is contingent upon receipt of another sample from Dexter.

HERCULES POLYPROPYLENE FILTER TOW: Sample filters made with 3.9/40000 and 5.0/39000 tow items were tested for efficiency, firmness, and other filter characteristics. The filters were low in firmness (86%) but similar to CA filters in other properties. A larger quantity of filters is expected shortly to produce machine-made cigarettes for evaluation.

IV. IMPROVED FILTRATION - SELECTIVE FILTRATION:

- A. Objective: Explore the use of specific additives in filters for selective filtration or subjective modification of smoke.
- B. Status: Cigarette models with FML filters containing a new group of additives for subjective modification continue to be evaluated.

Filters containing a mixture of ethyl citrate esters which are compatible with triacetin are being made this month for analytical and subjective evaluation on GCC Marlboro and Lark cigarettes. Earlier studies with this additive had shown a 15% reduction in nicotine-to-tar ratio.

Several samples of carbon treated with acidic and basic additives were prepared for use in carbon/CA dual filters. These filters will be tested on 8mg ART models.

Carbon samples from three suppliers -- Calgon, Sutcliffe Speakman, and CECA -- are being tested as alternatives for single sourced materials. Cigarette samples have been made with the experimental carbons and their respective controls; analytical smoking, is being conducted.

V. FILTER SUPPORT FOR OTHER R&D PROGRAMS:

- A. Objective: Provide design assistance and potential new filter systems for other R&D programs.
- B. Status: CARBOWAX REPLACEMENT: Danchi test results of four models of PM Super Lights indicate that there was no significant difference in liking scores for the triacetin vs. Carbowax models. Models are now being made for a second Danchi test with slight changes to triacetin application levels.

Four new models of Parliament Lights 100's consisting of variations of Carbowax, triacetin, black tow, and white tow were approved and shipped for Danchi testing.

The Japan Product Development Group is now coordinating the fabrication of Merit Lights and L&M Milds models with triacetin for Danchi testing.

Carbon-on-paper filters from Baumgartner in a PM Super Lights configuration are being tested after two cycles of accelerated ageing. FTC tar deliveries with the paper filters are 5-6mg with 35% filter ventilation. Gas phase results after ageing are not complete.

ALTERNATIVE PLASTICIZERS: Six potential plasticizers were approved for investigation and have been ordered. Only one, diethyl malonate, has been received; testing will begin when all six are available.

LARK VENTILATION VARIABILITY STUDY: Sample bobbins of heat sealable porous combining wraps were received from Dexter and Kimberly-Clark and are being evaluated for reducing the variability of filter ventilation on Lark Milds.

Models of GCC Lark, Lark Milds, and Lark Super Lights were made with Hauni laser ventilation and tested for ventilation variability. The coefficient of variation of filter ventilation ranged from 6 to 11% for the Hauni laser models compared to 24% for standard production Lark Milds KS. Hauni laser perforations are more obvious on the cork-tipped cigarette than the current microlaser perforations.